
Central Coast Regional Water Quality Control Board

IRRIGATED LANDS REGULATORY PROGRAM

RESOURCES FOR GROWERS

**TIER 3 - CERTIFIED IRRIGATION AND NUTRIENT MANAGEMENT PLAN
(UPDATED FEBRUARY 28, 2014)**

This document provides a general overview of the Tier 3 Certified Irrigation and Nutrient Management Plan (INMP) requirement. Agricultural Order No. R3-2012-0011 and the related Tier 3 Monitoring and Reporting Program (MRP) requires Tier 3 growers with high nitrate loading risk farms/ranches, to develop and initiate implementation of an Irrigation and Nutrient Management Plan (INMP) certified by a Professional Soil Scientist, Professional Agronomist, or Crop Advisor certified by the American Society of Agronomy, or similarly qualified professional.

To review the requirements in detail, go to the Water Board's website at:
http://www.waterboards.ca.gov/centralcoast/water_issues/programs/ag_waivers/index.shtml

Who must develop a certified Irrigation and Nutrient Management Plan (INMP)?

Tier 3 growers with ranches classified as "high" risk for loading nitrate to groundwater must develop and implement a certified Irrigation and Nutrient Management Plan. The methods to determine if a ranch is high risk for loading nitrate to groundwater are specified in the Agricultural Order.

What is the purpose of the INMP?

Groundwater nitrate contamination from the excessive application of fertilizers is severe in the Central Coast region. The purpose of the INMP is to budget and manage the nutrients applied to each farm/ranch or nitrate loading risk unit considering all sources of nutrients, crop requirements, soil types, climate, and local conditions in order to minimize nitrate loading to surface water and groundwater in compliance with the Agricultural Order.

What information do growers need to have in order to develop and implement the INMP plan?

Growers should work with their Certified Crop Advisory (CCA) and have the following information to develop and implement the INMP plan:

- Factors that the grower used to determine nitrate loading risk for each farm/ranch or farm/ranch subdivisions (risk units);
- Records of the type of crops grown and acreage;
- Documentation of methods used to determine nitrogen crop need;

- Records for the total nitrogen applied in lbs/acre per crop for each field, volume of irrigation water applied, and the average nitrogen concentration in irrigation water;
- List of irrigation and nutrient management practices already implemented on the ranch and how they are evaluated to determine if they are effective.
- List of practices, efforts, changes or controls planned to be implemented in the future.

What are the required elements of the INMP?

The INMP must include the following elements:

- a. Proof of INMP certification;
- b. Map locating each farm/ranch or nitrate loading risk unit. The plan should clearly point out the blocks and or areas that have a high potential for loading nitrogen to groundwater and the factors used to calculate the risk;
- c. Identification of nitrate loading risk factors or input to the Groundwater Pollution Nitrate Hazard Index and overall Nitrate Loading Risk level calculation for each ranch/farm or nitrate loading risk unit;
- d. Identification of crop nitrogen uptake values for use in nutrient balance calculations;
- e. Record keeping annually by either Method 1 or Method 2:
 - Method 1 (by field or management block):
 - i. The total nitrogen applied in lbs/acre per crop, for each field or management block and identification of the crop type. Total nitrogen applied includes any product, form, or concentration) including, but not limited to, organic and inorganic fertilizers, slow release products, compost, compost teas, manure, and extracts. The grower shall also identify the underlying basis for the amount of total nitrogen that the grower decided to apply. The grower may report more than one basis.
 - ii. Average nitrogen concentration in irrigation water during the annual reporting period, reported as total nitrogen in mg/L, applied to each farm/ranch or nitrate loading risk unit, and also the calculated or estimated nitrogen load in lbs/acre for each field or management block.
 - iii. Total nitrogen present in the soil in lbs/acre for each field or management block prior to the first application fertilizer to the crop.
 - Method 2 (by nitrate loading risk unit):

Same information than listed under method 1, plus

 - i. Total acres of each nitrate loading risk unit.
 - ii. Total acres of each crop type grown within the nitrate loading risk unit during the annual reporting period.
- f. To meet the requirement to record total nitrogen in the soil, growers may take a nitrogen soil sample (e.g. laboratory analysis or nitrate quick test) or use an alternative method to evaluate nitrogen content in soil, prior to planting or seeding the field or prior to the time of pre-sidedressing. The amount of nitrogen remaining in the soil must be accounted for as a source of nitrogen when budgeting, and the soil sample or alternative method results must be maintained in the INMP.
- g. Identification of irrigation and nutrient management practices in progress (identify start date), completed (identify completion date), and planned (identify anticipated start date) to reduce nitrate loading to groundwater to achieve compliance with this Order.
- h. Description of methods Grower will use to verify overall effectiveness of the INMP.

What type(s) of practices should be considered for implementation as part of the INMP?

1. Practices Implemented During Crop Growing Season(s).

2. Practices Implemented Between Crop Growing Season(s): (Example: cover crops), to Trapping Nutrients between crop growing season(s) and minimize nitrate discharge/leaching to groundwater, primarily due to rainfall. This information may include:
 - a. Estimations of the amounts of nitrogen remaining in the root zone after harvest, and actions to minimize leaching.
 - b. Estimations of the amounts of nitrogen present in the crop residues subject to mineralization, and actions to minimize leaching.
 - c. If salts are leached, information regarding the volume of water applied to leach salts, results of soil and water analysis, type of salts being leached, and an explanation of the timing when leaching is performed.

What are the INMP implementation due dates and submittal requirements?

Growers with Tier 3 ranches with a high nitrate loading risk must develop and start implementation of the INMP, immediately after their risk determination confirms their ranches (or risk units) are high risk. The INMP is not required to be submitted, with the exception of an INMP Effectiveness Report, due on October 1, 2016.

Who must certify the INMP plan?

Professional Soil Scientists, Professional Agronomists, Crop Advisors certified by the American Society of Agronomy, or similarly qualified professional, with the necessary training and expertise can certify the INMP plans.

What must be indicated as part of the INMP certification?

The professional certification must indicate that the relevant expert has reviewed all necessary documentation and testing results, evaluated (total nitrogen applied relative to typical crop nitrogen uptake and nitrogen removed at harvest), with consideration to potential nitrate loading to groundwater, and conducted field verification to ensure accuracy of reporting. The professional certification should consider the following to evaluate potential losses of nitrogen:

Nitrogen balance relative to typical crop nitrogen uptake:

$$\text{Nitrogen Balance} = \frac{\text{Total Nitrogen Applied and Soil Nitrogen Credits}}{\text{Typical Nitrogen Crop Uptake}}$$

Nitrogen balance relative to nitrogen removed at harvest:

$$\text{Nitrogen Balance} = \frac{\text{Total Nitrogen Applied and Soil Nitrogen Credits}}{\text{Nitrogen Removed at Harvest}}$$

What type of information must the certified professional consider?

Prior to certifying a plan, the professional certifier should evaluate the following information related to irrigation AND nutrient management:

Supply and Demand of Water - Irrigation water application recordkeeping and budgeting, as part of the consideration to evaluate potential nitrate loading to groundwater.

This information should include annual records of the total amount of water applied plus rainfall with the total amount of water needed to grow the crops (including: Etcrop, irrigation

inefficiencies, leaching, etc.). The goal is to use the annual records to confirm that the total volume of water applied is approaching the total amount of water required to grow the crop(s). Records should include the amount of rainfall during the crop(s) growing season, irrigation runoff information (if present) of the volume, timing (season), and discharge points, irrigation water stored in reservoirs, ponds, other structures, soil moisture content or retention in root zone, and any other appropriate measurement to:

1. Show progress and/or confirm that annual water applications (volume) are approaching the volume of water required to grow the crop(s),
2. Leaching of salts and potential nitrogen discharge to groundwater, including the volume of water applied for leaching, results of soil and water analysis, type of salts being leached, timing of leaching considering the potential to discharge/load nitrate to groundwater.

At a minimum, the certified plan should include the following:

- Calculated amount (demand) of water needed for crops grown in the ranches,
- Irrigation water application recordkeeping – total volume of water applied,
- Irrigation water budget – comparison of the amounts of water applied with crop(s) demand and estimation of amounts over applied or under applied.

Supply and Demand of Nitrogen - Nitrogen application recordkeeping and budgeting to evaluate the total nitrogen applied relative to typical crop nitrogen uptake and the nitrogen removed at harvest.

This information should include annual records of the total amount of Nitrogen applied, total amount of Nitrogen needed to grow crops (or Typical Nitrogen Crop Uptake), and information regarding the amounts of nitrogen removed with the harvested portions of the crops. The goal is to evaluate the annual records to document progress and/or to confirm that annual Nitrogen applications are approaching the typical amount of Nitrogen required to grow the crop(s). The total amounts of nitrogen applied must be compared to the typical crop nitrogen uptake(s) and nitrogen removed at harvest with proper evaluation and consideration of the potential for loading nitrate to groundwater.

At a minimum, the certified plan should include the following:

- Information about the typical amount of nitrogen uptake by the crops grown in the ranches,
- Information about the Amount of Nitrogen Removed at Harvest by the Crops grown in the ranches,
- Total annual amount of Nitrogen applications, including nitrogen in irrigation water,
- Compare the total amount of nitrogen applied with the crop(s) typical amount of nitrogen needed/uptake – given the area, variety, local conditions, soil type, other,
- Compare the total amount of nitrogen applied with the amount of nitrogen removed at harvest,
- Proper estimations of the amounts of Nitrogen over applied and/or under applied.

NOTE: The typical amount of nitrogen uptake by the crop(s) and the amount of nitrogen removed at harvest can be found in literature, research studies, and other published documents. For the purpose of making these estimations and comparisons, existing published values will be accepted; site specific determinations or measurements of these parameters is not required, but is an acceptable alternative.

What does the INMP Effectiveness Report include?

Tier 3 Growers must evaluate the effectiveness of the INMP and include the results as a report submitted to the Water Board. Irrigation and Nutrient Management Plan effectiveness monitoring must evaluate reductions in loading based on reduced fertilizer use and improved

irrigation and nutrient management practices in order to minimize nitrate loading to surface water and groundwater. Evaluation methods may include, but are not limited to analysis of groundwater well monitoring data or soil sample data, or analysis of trends in nitrogen application data.

When is the INMP Effectiveness Report due?

By October 1, 2016, Tier 3 Growers with High Nitrate Loading Risk farms/ranches must verify the overall effectiveness of the INMP and submit the report electronically in a format specified by the Executive Officer.

Can growers work together to determine their INMP effectiveness?

Yes. Growers in the same groundwater basin or subbasin may choose to comply with this requirement as a group by submitting a single report that evaluates the overall effectiveness of the broad scale implementation of irrigation and nutrient management practices identified in individual INMPs to protect groundwater. Group efforts must use data from each farm/ranch (e.g., data from individual groundwater wells, soil samples, or nitrogen application). The INMP Effectiveness Report must include a description of the methodology used to evaluate and verify effectiveness of the INMP.